



SEQUENCE LISTING

RECEIVED
NOV 08 2002
TECH CENTER 1600/2900

5 <110> Rosenberg, Eugene
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Orr, Elisha
Paitan, Yossi

<120> GENE CLUSTER

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<140> 09/710,262
<141> 2000-11-10

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<170> PatentIn Ver. 2.1

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30 Ile Val Pro Ser Gly Gln Val Ser Ala Glu Val His Glu Val Pro Ser
35 40 45

35 Val Ser Asp Ser Ala Leu Val Ala Thr Leu Arg Ala Ser Ala Lys Val
50 55 60

Pro Phe Asp Leu Ala Cys Gly Pro Leu Ala Arg Leu His Leu Tyr Ser
65 70 75 80

40 Arg Ser Glu His Glu His Val Leu Leu Leu Cys Phe His His Leu Val
85 90 95

Leu Asp Gly Ala Ser Val Ala Pro Leu Leu Asp Ala Leu Arg Glu Arg
100 105 110

45 Tyr Ala Gly Thr Glu Ala Lys Ala Gly Leu Leu Glu Val Pro Ile Val
115 120 125

50 Ala Pro Tyr Arg Ala Ala Val Glu Trp Glu Gln Leu Ala Ile Gly Gly
130 135 140

Asp Glu Gly Arg Arg His Leu Asp Tyr Trp Arg His Val Leu Ala Thr
145 150 155 160

55 Pro Val Pro Pro Pro Leu Asn Leu Pro Thr Asp Arg Pro Arg Ser Ala
165 170 175

Thr Gly Leu Asp Ser Glu Gly Ala Thr His Ser Gln Arg Val Pro Thr
180 185 190

60 Glu Gln Ala Leu Arg Leu Arg Glu Phe Ala Arg Ala Gln Gln Val Ser

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| 5 | Leu Pro Thr Val 210 | Leu Leu Gly 215 | Leu Tyr Tyr Ala Leu Leu His Arg His 220 |
| | Thr Arg Gln Asp 225 | Asp Val Val 230 | Val Gly Ile Pro Thr Met Gly Arg Pro 235 240 |
| 10 | Arg Ala Glu Leu 245 | Ala Thr Ala Ile 250 | Gly Tyr Phe Val Asn Val Met Ala 255 |
| | Val Arg Ala Arg 260 | Gly Leu Gly Gln 265 | His Ser Phe Gly Ser Leu Leu Arg 270 |
| 15 | His Leu His Asp 275 | Ser Val Ile Asp 280 | Gly Leu Glu His Ala His Tyr Pro 285 |
| | Phe Pro Arg Val 290 | Val Lys Asp 295 | Leu Arg Leu Ser Asn Gly Pro Glu Glu 300 |
| 20 | Ala Pro Gly Phe 305 | Gln Thr Met 310 | Phe Thr Phe Gln Ser Leu Gln Leu Thr 315 320 |
| 25 | Ser Ala Pro 325 | Pro Arg Pro Glu 330 | Pro Arg Ser Gly Gly Leu Pro Glu Leu 335 |
| | Glu Pro Leu Asp 340 | Cys Val His Gln 345 | Glu Gly Ala Tyr Pro Leu Glu Leu 350 |
| 30 | Glu Val Val Glu 355 | Gly Ala Lys 360 | Gly Leu Thr Leu His Phe Lys Tyr Asp 365 |
| | Ala Arg Leu Tyr 370 | Glu Ala Asp 375 | Thr Val Glu Arg Met Ala Arg Gln Leu 380 |
| 35 | Leu Arg Ala Ala 385 | Asp Gln Val 390 | Ala Asp Gly Val Glu Ser Pro Leu Ser 395 400 |
| 40 | Ala Leu Ser Trp 405 | Leu Asp Asp 410 | Glu Glu Arg Arg Thr Leu Leu Arg Asp 415 |
| | Trp Asn Ala Thr 420 | Ala Thr Pro 425 | Phe Leu Glu Asp Leu Gly Val His Glu 430 |
| 45 | Leu Phe Gln Arg 435 | Gln Ala Arg 440 | Glu Thr Pro Asp Ala Met Ala Val Ser 445 |
| | Tyr Glu Gly His 450 | Ser Leu Ser 455 | Tyr Gln Ala Leu Asp Thr Arg Ser Arg 460 |
| 50 | Glu Ile Ala Ala 465 | His Leu Lys 470 | Ser Phe Gly Val Lys Pro Gly Ala Leu 475 480 |
| 55 | Val Gly Ile Tyr 485 | Leu Asp Arg 490 | Ser Ala Glu Leu Val Ala Ala Met Leu 495 |
| | Gly Val Leu Ser 500 | Ala Gly Ala 505 | Tyr Val Pro Leu Asp Pro Val His 510 |
| 60 | Pro Glu Asp Arg 515 | Leu Arg Tyr 520 | Met Leu Glu Asp Ser Gly Val Val Val 525 |

Val Leu Ala Arg Gln Ala Ser Arg Asp Lys Val Ala Ala Ile Ala Gly
 530 535 540

5 Ala Ser Cys Lys Val Cys Val Leu Glu Asp Val Lys Ala Gly Ala Thr
 545 550 555 560

Ser Ala Pro Ala Gly Thr Ser Pro Asn Gly Leu Ala Tyr Val Ile Tyr
 565 570 575

10 Thr Ser Gly Ser Thr Gly Arg Pro Lys Gly Val Met Ile Pro His Arg
 580 585 590

15 Gly Val Val Asn Phe Leu Leu Cys Met Arg Arg Thr Leu Gly Leu Lys
 595 600 605

Arg Thr Asp Ser Leu Leu Ala Val Thr Thr Tyr Cys Phe Asp Ile Ala
 610 615 620

20 Ala Leu Glu Leu Leu Leu Pro Leu Cys Ala Gly Ala Gln Val Ile Ile
 625 630 635 640

Ala Ser Ala Glu Thr Val Arg Asp Ala Gln Ala Leu Lys Arg Ala Leu
 645 650 655

25 Arg Thr His Arg Pro Thr Leu Met Gln Ala Thr Pro Ala Thr Trp Thr
 660 665 670

30 Leu Leu Phe Gln Ser Gly Trp Glu Asn Ala Glu Arg Val Arg Ile Leu
 675 680 685

Cys Gly Gly Glu Ala Leu Pro Glu Ser Leu Lys Ala His Phe Val Arg
 690 695 700

35 Thr Ala Ser Asp Val Trp Asn Met Phe Gly Pro Thr Glu Thr Thr Ile
 705 710 715 720

Trp Ser Thr Met Ala Lys Val Ser Ala Ser Arg Pro Val Thr Ile Gly
 725 730 735

40 Lys Pro Ile Asp Asn Thr Gln Val Tyr Val Leu Asp Asp Arg Met Gln
 740 745 750

45 Pro Val Pro Ile Gly Val Pro Gly Glu Leu Trp Ile Ala Gly Ala Gly
 755 760 765

Val Ala Cys Gly Tyr Leu Asn Arg Pro Ala Leu Thr Ala Glu Arg Phe
 770 775 780

50 Val Ser Asn Pro Phe Thr Pro Gly Thr Thr Leu Tyr Arg Thr Gly Asp
 785 790 795 800

Leu Ala Arg Trp Arg Ala Asp Gly Glu Val Glu Tyr Leu Gly Arg Leu
 805 810 815

55 Asp His Gln Val Lys Val Arg Gly Phe Arg Ile Glu Met Gly Glu Ile
 820 825 830

60 Glu Ala Gln Leu Ala Gly His Pro Ser Val Lys Asn Cys Ala Val Val
 835 840 845

Ala Lys Glu Leu Asn Gly Thr Ser Gln Leu Val Ala Tyr Cys Gln Pro
 850 855 860

5 Ala Gly Thr Ser Phe Asp Glu Glu Ala Ile Arg Ala His Leu Arg Lys
 865 870 875 880

Phe Leu Pro Asp Tyr Met Val Pro Ala His Val Phe Ala Val Asp Ala
 885 890 895

10 Ile Pro Leu Ser Gly Asn Gly Lys Val Asp Arg Gly Gln Leu Met Ala
 900 905 910

Arg Pro Val Val Thr Arg Arg Lys Thr Ser Ala Val His Ala Arg Ser
 915 920 925

15 Pro Val Glu Ala Thr Leu Val Glu Leu Trp Lys Asn Val Leu Gln Val
 930 935 940

20 Asn Glu Val Gly Val Glu Asp Arg Phe Phe Glu Val Gly Gly Asp Ser
 945 950 955 960

Val Leu Ala Ala Val Leu Val Glu Glu Met Asn Arg Arg Phe Asp Thr
 965 970 975

25 Arg Leu Ala Val Thr Asp Leu Phe Lys Tyr Val Asn Ile Arg Asp Met
 980 985 990

Ala Arg His Met Glu Gly Ala Thr Ala Gln Ala Arg Thr Gly Ala Thr
 995 1000 1005

30 Glu Pro Ala Arg Glu Asp Thr Ala Ser Glu Arg Asp Tyr Glu Gly Ser
 1010 1015 1020

35 Leu Ala Val Ile Gly Ile Ser Cys Gln Leu Pro Gly Ala Ala Asp Pro
 1025 1030 1035 1040

Trp Arg Phe Trp Lys Asn Leu Arg Glu Gly Arg Asp Ser Val Val Ala
 1045 1050 1055

40 Tyr Arg His Glu Glu Leu Arg Glu Leu Gly Val Pro Glu Glu Val Leu
 1060 1065 1070

Arg Asp Ser Arg Tyr Val Ala Val Arg Ser Ser Ile Glu Asp Lys Glu
 1075 1080 1085

45 Cys Phe Asp Pro His Phe Phe Gly Leu Thr Ala Arg Asp Ala Ser Phe
 1090 1095 1100

50 Met Asp Pro Gln Phe Arg Leu Leu Leu Met His Ala Trp Lys Ala Val
 1105 1110 1115 1120

Glu Asp Ala Ala Thr Thr Pro Glu Arg Leu Gly Pro Cys Gly Val Phe
 1125 1130 1135

55 Met Thr Ala Ser Asn Ser Phe Tyr His Gln Gly Ser Pro Gln Phe Pro
 1140 1145 1150

Ala Asp Gly Gln Pro Val Leu Arg Thr Ala Glu Glu Tyr Val Leu Trp
 1155 1160 1165

60 Val Leu Ala Gln Ala Gly Ser Ile Pro Thr Met Val Ser Tyr Lys Leu

| | 1170 | 1175 | 1180 | |
|----|---|------|------|------|
| | Gly Leu Lys Gly Pro Ser Leu Phe Val His Thr Asn Cys Ser Ser Ser | | | |
| | 1185 | 1190 | 1195 | 1200 |
| 5 | Leu Ser Ala Leu Tyr Val Ala Gln Gln Ala Ile Ala Ala Gly Asp Cys | | | |
| | 1205 | 1210 | 1215 | |
| 10 | Gln Thr Ala Leu Val Gly Ala Ala Thr Val Phe Pro Ser Ala Asn Leu | | | |
| | 1220 | 1225 | 1230 | |
| | Gly Tyr Leu His Gln Arg Gly Leu Asn Phe Ser Ser Ala Gly Arg Val | | | |
| | 1235 | 1240 | 1245 | |
| 15 | Lys Ala Phe Asp Ala Ala Ala Asp Gly Met Ile Ala Gly Glu Gly Val | | | |
| | 1250 | 1255 | 1260 | |
| 20 | Ala Val Leu Val Val Lys Asp Ala Ala Ala Val Arg Asp Gly Asp | | | |
| | 1265 | 1270 | 1275 | 1280 |
| | Pro Ile Tyr Cys Leu Val Arg Lys Val Gly Ile Asn Asn Asp Gly Gln | | | |
| | 1285 | 1290 | 1295 | |
| 25 | Asp Lys Val Gly Leu Tyr Ala Pro Ser Ala Thr Gly Gln Ala Glu Val | | | |
| | 1300 | 1305 | 1310 | |
| | Ile Arg Arg Leu Phe Asp Arg Thr Gly Ile Asp Pro Ala Ser Ile Gly | | | |
| | 1315 | 1320 | 1325 | |
| 30 | Tyr Val Glu Ala His Gly Thr Gly Thr Leu Leu Gly Asp Pro Val Glu | | | |
| | 1330 | 1335 | 1340 | |
| | Val Ser Ala Leu Ser Glu Ala Phe Arg Thr Phe Thr Asp Arg Arg Gly | | | |
| | 1345 | 1350 | 1355 | 1360 |
| 35 | Tyr Cys Arg Leu Gly Ser Val Lys Ser Asn Leu Gly His Leu Asp Thr | | | |
| | 1365 | 1370 | 1375 | |
| 40 | Val Ala Gly Leu Ala Gly Leu Ile Lys Thr Ala Leu Ser Leu Arg Gln | | | |
| | 1380 | 1385 | 1390 | |
| | Gly Glu Val Pro Pro Thr Leu His Val Thr Gln Val Asn Pro Lys Leu | | | |
| | 1395 | 1400 | 1405 | |
| 45 | Glu Leu Thr Asp Ser Pro Phe Val Ile Ala Asp Arg Leu Ala Pro Trp | | | |
| | 1410 | 1415 | 1420 | |
| | Pro Ser Leu Pro Gly Pro Arg Arg Ala Ala Val Ser Ala Phe Gly Leu | | | |
| | 1425 | 1430 | 1435 | 1440 |
| 50 | Gly Gly Thr Asn Thr His Ala Ile Leu Glu His Tyr Pro Arg Asp Ser | | | |
| | 1445 | 1450 | 1455 | |
| 55 | Arg Pro Arg Glu Arg Ser Gln Arg Ser Asn Ala Val Arg Ala Val Ala | | | |
| | 1460 | 1465 | 1470 | |
| | Pro Phe Ser Ala Arg Thr Leu Glu Ala Leu Lys Asp Asn Leu Arg Ala | | | |
| | 1475 | 1480 | 1485 | |
| 60 | Leu Leu Asp Phe Leu Glu Asp Pro Ala Ser Ala Glu Val Ala Leu Ala | | | |
| | 1490 | 1495 | 1500 | |

| | |
|----|--|
| | Asp Ile Thr Tyr Thr Leu Gln Val Gly Arg Val Ala Met Pro Glu Arg |
| | 1505 1510 1515 1520 |
| 5 | Met Val Val Thr Ala Ser Thr Arg Asp Glu Leu Val Glu Gly Leu Arg |
| | 1525 1530 1535 |
| | Arg Gly Ile Ala Thr Val Gly Gly Ala His Val Gly Thr Val Val Asp |
| | 1540 1545 1550 |
| 10 | Thr Ser Pro Ser Val Asp Ala Asp Ala Arg Ala Val Ala Glu Ala Trp |
| | 1555 1560 1565 |
| | Ala Thr Gly Asp Ser Ile Asp Trp Asp Ser Leu His Gly Asp Val Lys |
| 15 | 1570 1575 1580 |
| | Pro Ala Arg Val Ser Leu Pro Thr Tyr Gln Phe Ala Lys Glu Arg Tyr |
| | 1585 1590 1595 1600 |
| 20 | Gly Leu Ser Pro Ala His Ser Val Ala Asn Ser Ser Lys Thr His Pro |
| | 1605 1610 1615 |
| | Asp Ala Gly Val Pro Leu Phe Val Pro Thr Trp Gln Pro Trp Ser Glu |
| | 1620 1625 1630 |
| 25 | Gly Ala Ser Asn Ala Ser Leu Ala Leu Arg His Leu Val Val Leu Cys |
| | 1635 1640 1645 |
| | Glu Pro Leu Asp Ala Leu Gly Ala Glu Gly Ala Ser Ala Leu Ala Ser |
| 30 | 1650 1655 1660 |
| | Thr Leu Ala Asp Arg Arg Ile Glu Val Val Arg Thr Ser Ser Pro Ser |
| | 1665 1670 1675 1680 |
| 35 | Ala Arg Leu Asp Ala Arg Phe Met Ala His Ala Ser Ala Val Phe Glu |
| | 1685 1690 1695 |
| | Arg Val Lys Ala Leu Leu Ser Glu Arg Leu Thr Ala Pro Val Thr Leu |
| | 1700 1705 1710 |
| 40 | Gln Val Leu Val Pro Glu Glu Arg Asp Ala Leu Ala Leu Ser Gly Leu |
| | 1715 1720 1725 |
| | Gly Ser Leu Leu Arg Ser Val Ser Gln Glu Asn Pro Leu Val Arg Gly |
| 45 | 1730 1735 1740 |
| | Gln Leu Ile Arg Val Gln Gly Ser Val Ser Ala Ser Ala Leu Val Asp |
| | 1745 1750 1755 1760 |
| 50 | Val Leu Val Lys Ser Ala Arg Ala Gly Asp Val Thr Asp Ser Arg Tyr |
| | 1765 1770 1775 |
| | His Ala Gly Gln Leu Ser Arg Cys Glu Trp Arg Glu Ala Arg Val Ala |
| | 1780 1785 1790 |
| 55 | Lys Gly Asp Ala Ser Arg Phe Trp Arg Glu Asp Gly Val Tyr Val Ile |
| | 1795 1800 1805 |
| | Ser Gly Gly Thr Gly Ala Leu Ala Arg Leu Phe Val Ala Glu Ile Gly |
| 60 | 1810 1815 1820 |

| | |
|----|--|
| | Lys Arg Ala Thr Arg Ala Thr Val Ile Leu Val Ala Arg Ala Ser Ser |
| | 1825 1830 1835 1840 |
| 5 | Ala Glu Ala Val Asp Gly Gly Asn Gly Leu Arg Val Arg His Leu Pro |
| | 1845 1850 1855 |
| | Val Asp Val Thr Gln Pro Asn Asp Val Asn Ala Phe Val Ala Thr Val |
| | 1860 1865 1870 |
| 10 | Leu Arg Glu His Gly Arg Ile Asp Gly Val Ile His Ala Ala Gly Ile |
| | 1875 1880 1885 |
| | Arg Arg Asp Asn Tyr Leu Leu Asn Lys Pro Val Ala Glu Met Gln Ala |
| | 1890 1895 1900 |
| 15 | Val Leu Ala Pro Lys Val Val Gly Leu Val Asn Leu Asp His Ala Thr |
| | 1905 1910 1915 1920 |
| 20 | Arg Glu Leu Pro Leu Asp Phe Phe Val Thr Phe Ser Ser Leu Ala Ala |
| | 1925 1930 1935 |
| | Phe Gly Asn Ala Gly Gln Ser Asp Tyr Ala Ala Ala Asn Gly Phe Met |
| | 1940 1945 1950 |
| 25 | Asp Gly Phe Ala Glu Ser Arg Ala Ala Leu Val Asn Ala Gly Gln Arg |
| | 1955 1960 1965 |
| | Gln Gly Arg Thr Val Ser Ile Arg Trp Pro Leu Trp Glu Asn Gly Gly |
| | 1970 1975 1980 |
| 30 | Met Gln Leu Asp Ser Arg Ser Arg Glu Val Leu Met Gln Arg Thr Gly |
| | 1985 1990 1995 2000 |
| 35 | Met Ala Ala Leu Gly Asp Glu Ala Gly Leu Gly Ala Phe Tyr Arg Ala |
| | 2005 2010 2015 |
| | Leu Glu Leu Gly Ser Pro Gly Val Ala Val Trp Thr Gly Glu Ala Gln |
| | 2020 2025 2030 |
| 40 | Arg Phe Arg Glu Leu Ser Val Ser Val Ser Pro Ala Pro Pro Pro His |
| | 2035 2040 2045 |
| | Gln Val Ala Leu Asp Ala Val Val Ser Ile Thr Glu Lys Val Glu Thr |
| | 2050 2055 2060 |
| 45 | Lys Leu Lys Ala Leu Phe Ser Glu Val Thr Arg Tyr Glu Glu Arg Arg |
| | 2065 2070 2075 2080 |
| 50 | Ile Asp Ala Arg Gln Pro Met Glu Arg Tyr Gly Ile Asp Ser Ile Ile |
| | 2085 2090 2095 |
| | Ile Thr Gln Met Asn Gln Ala Leu Glu Gly Pro Tyr Asn Ala Leu Ser |
| | 2100 2105 2110 |
| 55 | Lys Thr Leu Phe Phe Glu Tyr Arg Thr Leu Ala Glu Val Ser Gly Tyr |
| | 2115 2120 2125 |
| | Leu Ala Glu His Arg Ala Glu Glu Ser Ala Lys Trp Val Ala Ala Pro |
| | 2130 2135 2140 |
| 60 | Gly Glu Asn Ser Ser Ser Val Ile Gln Glu Ala Arg Pro Pro Arg Ala |

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| | Asp Ala Thr His Arg Ala Pro Arg Ala Asp Glu Pro Ile Ala Val Ile | | | |
| | 2165 | | 2170 | 2175 |
| 5 | Gly Met Ser Gly Arg Tyr Pro Gly Ala Glu Asn Leu Thr Glu Phe Trp | | | |
| | 2180 | | 2185 | 2190 |
| 10 | Glu Arg Leu Ser Arg Gly Asp Asp Cys Ile Thr Glu Ile Pro Pro Glu | | | |
| | 2195 | | 2200 | 2205 |
| | Arg Trp Ser Leu Asp Gly Phe Phe Tyr Pro Asp Lys Lys His Ala Ala | | | |
| | 2210 | | 2215 | 2220 |
| 15 | Ala Arg Gly Met Ser Tyr Ser Lys Trp Gly Gly Phe Leu Gly Gly Phe | | | |
| | 2225 | | 2230 | 2235 |
| | | | | 2240 |
| | Ala Asp Phe Asp Pro Leu Phe Phe Asn Ile Ser Pro Arg Glu Ala Thr | | | |
| | 2245 | | 2250 | 2255 |
| 20 | Ser Met Asp Pro Gln Glu Arg Leu Phe Leu Gln Ser Cys Trp Glu Val | | | |
| | 2260 | | 2265 | 2270 |
| 25 | Leu Glu Asp Ala Gly Tyr Thr Arg Asp Ser Leu Ala Gln Arg Phe Gly | | | |
| | 2275 | | 2280 | 2285 |
| | Ser Ala Val Gly Val Phe Ala Gly Ile Thr Lys Thr Gly Tyr Glu Leu | | | |
| | 2290 | | 2295 | 2300 |
| 30 | Tyr Gly Ala Glu Leu Glu Gly Arg Asp Ala Ser Val Arg Pro Tyr Thr | | | |
| | 2305 | | 2310 | 2315 |
| | | | | 2320 |
| | Ser Phe Ala Ser Val Ala Asn Arg Val Ser Tyr Leu Leu Asp Leu Lys | | | |
| | 2325 | | 2330 | 2335 |
| 35 | Gly Pro Ser Met Pro Val Asp Thr Met Cys Ser Ala Ser Leu Thr Ala | | | |
| | 2340 | | 2345 | 2350 |
| 40 | Val His Met Ala Cys Glu Ala Leu Gln Arg Gly Ala Cys Val Met Ala | | | |
| | 2355 | | 2360 | 2365 |
| | Ile Ala Gly Gly Val Asn Leu Tyr Val His Pro Ser Ser Tyr Val Ser | | | |
| | 2370 | | 2375 | 2380 |
| 45 | Leu Ser Gly Gln Gln Met Leu Ser | | | |
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| | ctgtccgcgc | tgtacgtggc | tcagcaggcc | atcgacgcgg | gagactgcca | gacggcgctg | 3660 |
| 55 | gtggggggccg | ccacggtctt | cccttcggcg | aacttgggtt | atctgcacca | gcgggggctc | 3720 |
| | aacttctcca | gcgcggggcg | ggtcaaggcc | ttcgacgcgg | cggcgagcgg | catgattgcc | 3780 |
| | ggtgaagggtg | tcgcccgtgct | ggtggtgaag | gacgccgcag | cggcggtgcg | cgatggcgac | 3840 |
| | ccaatctact | gcctcgtgcg | gaaggtgggg | atcaacaacg | acggccagga | caaggtgggt | 3900 |
| | ttatacgccc | cgagcgccac | cgggcaggcg | gaggtcatcc | ggcgtctgtt | cgaccggacc | 3960 |
| 60 | ggcatcgacc | ctgcatcgat | tggctacgtc | gaggcccatg | gcaccggaac | cttgcgtgggt | 4020 |
| | gacctgtcgc | aggtctccgc | gctgagcgaa | gccttccgga | ccttcaccga | ccggcgcggg | 4080 |

| | | | | | | | |
|----|-------------|-------------|-------------|-------------|------------|-------------|------|
| | tactgccggc | tgggctcggg | gaagtcgaac | ctgggccatc | tggacacagt | ggctggactg | 4140 |
| | gctggggtca | tcaagacggc | gctgagcctg | cggcagggcg | aagttcctcc | gacgctccat | 4200 |
| | gtgacccagg | tgaatccgaa | gctcgagctg | acggattcgc | cgttcgtcat | cgccgaccgt | 4260 |
| 5 | ttggcgccgt | ggccgtccct | gccgggaccg | aggcgggcg | ccgtgagtgc | gttcggccctt | 4320 |
| | ggcgggacga | ataccacgc | cattctcgaa | cactacccgc | gcgactcccg | cccacgggag | 4380 |
| | aggagccagc | ggtcgaacgc | agtcctgtgc | gtggctccat | tctcggcgcg | cacctggag | 4440 |
| | gcgttgaagg | acaacctccg | cgcgtgtctc | gacttccttg | aggacccggc | gtccgcggag | 4500 |
| | gtggcgctcg | cggacatcac | ctacacgttg | caggtcggcc | gggtcgcgat | gcctgagcgg | 4560 |
| | atggtggtga | ctgcgtcgac | gcgcgacgaa | ttggtggagg | gactgcggcg | aggcatcgcg | 4620 |
| 10 | acggtgggcg | gtgcccacgt | gggaacgggtg | gtcgatacgt | caccacagct | ggatgccgat | 4680 |
| | gctcgggcag | ttgcggaggc | gtgggcgacg | ggcgactcga | ttgactggga | ttcgctgcac | 4740 |
| | ggtgacgtga | agcccgcccc | tgtcagcctg | cccacgtatc | agttcgcgaa | ggagcgctac | 4800 |
| | gggtttgtcg | ccgcgcactc | cgtggcgaa | tcctccaaga | cgcatcctga | cgcggtgtgc | 4860 |
| | ccgctcttcg | ttccgacctg | gcagccgtgg | tctgagggcg | cgtaaaatgc | ctcggtggcg | 4920 |
| 15 | ctccggcacc | tggtggtggt | gtgcgagcct | cttgatgcgc | tgggggctga | aggtgcctcc | 4980 |
| | gcgctggcga | gcacgctcgc | ggacaggcgc | atcgaagtgg | tcaggacgtc | cagcccaagt | 5040 |
| | gcgcggctgg | acgcgcggtt | catggcgcat | gcctcggcgg | tcttcgaacg | cgtaaggcgg | 5100 |
| | ctgctgtcgc | agcgtctgac | cgtcctgttg | acattgcagg | tgctggtgcc | agaggagcgg | 5160 |
| | gatgcgctgg | cactgagtgg | cctggggagc | ctgctgcgtt | cggtgtcgca | ggagaatccg | 5220 |
| 20 | ttggtccggg | ggcagctcat | ccgcgtccag | ggaagcgtct | ccgcacggcg | gctggtggac | 5280 |
| | gttctggtga | agtccgcgcg | cgccggtgac | gtcaccgatt | cgcggtacca | cgcgggccag | 5340 |
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| | cgcgaaagacg | gcgtctatgt | gatttcagga | ggaaccggcg | ccctggcccc | gctgttcgtc | 5460 |
| | gccgaaatcg | ggaagcgcgc | gacgcggggc | accgtcattc | tggttgcccc | cgcatcctcg | 5520 |
| 25 | gcggaggcgg | tggacgggtg | gaacgggctg | cgcgtgcggc | accttcccgt | ggatgtcacc | 5580 |
| | caaccgaacg | acgtgaacgc | ctttgtcgct | acggtgctgc | gcgaacacgg | gcgcacgcag | 5640 |
| | gggtgtcatcc | atgcggcggg | catccgcctg | gacaactacc | tgctcaacaa | gccggtggcg | 5700 |
| | gaaatgcagg | cggtgtctgc | gcccgaaggtg | gtggggctcg | tcaacctgga | ccacgccacc | 5760 |
| | cgcgagctgc | ccctggattt | cttcgtcacg | ttctcgctcc | tggccgcgtt | tggaaacgcc | 5820 |
| 30 | ggtcagtcgg | actacgcggc | ggccaatggc | ttcatggacg | gattcgcgga | gtcccagagc | 5880 |
| | gcgctcgtga | acgcgcggaca | gcggcagggc | cggacggtgt | ccatccgttg | gccgctcttg | 5940 |
| | gagaacggcg | ggatgcagct | cgactcacgg | agccgtgagg | tcttgatgca | gcggaccggg | 6000 |
| | atggccgcgc | tgggagacga | agcgggactg | ggggcgcttct | accgggcgct | ggaactgggc | 6060 |
| | tccccctggtg | tcgcgggtgtg | gacgggggag | gcccagaggt | ttcgtgaact | ctccgtgagt | 6120 |
| 35 | gtttcgcccc | caccgcctcc | gcacagggtg | gcgttggacg | ccgtggtgtc | catcaccgag | 6180 |
| | aagggtcgaga | cgaagctgaa | ggcgctcttc | agcgaggtca | cgcgatacga | agagcgccgc | 6240 |
| | atcgatgccc | gccagccgat | ggagcgctat | ggcatcgact | ccatcatcat | cacgcagatg | 6300 |
| | aaccaagccc | tcgaagggcc | gtacaacgcc | ctctcgaaga | cgctgttctt | cgaataaccg | 6360 |
| | acgctcgcgg | aagtcagcgg | gtatctggcc | gagcaccgcg | cggaagagag | cgcgaaagtgg | 6420 |
| 40 | gtggcggcac | ctggagagaa | ttcgtcttcc | gtcatccagg | aggccaggcc | gccacgtgcg | 6480 |
| | gatgcgacgc | accgggcgcc | tcgcgcgcgac | gagcccatcg | ccgtcatttg | catgagcggc | 6540 |
| | cgttatcccc | ggcgggagaa | cctgacggag | ttctgggagc | gcctgagccg | cggtgacgac | 6600 |
| | tgcatacccg | agattccgcc | agagcgctgg | tcggtggacg | ggttcttcta | cccggacaag | 6660 |
| | aagcaccccg | ccgcgcgggg | gatgagctac | agcaagtggg | gcggcttctc | cggcggcttc | 6720 |
| 45 | gctgacttcg | accgcgtgtt | cttcaacatc | tcgcgcgtg | aggcgacgag | catggacccg | 6780 |
| | caggagcgtc | tgttctctgca | gagctgctgg | gaggtcctgg | aggacgcggg | gtacaccccg | 6840 |
| | gacagcctgg | cccagcgctt | tggcagcgcg | gtgggcgttt | tcgcgggaat | cacgaagacg | 6900 |
| | ggctacgaac | tctacggcgc | ggagctggaa | ggacgagatg | cctcggtccg | gccctatacg | 6960 |
| | tcgtttgctg | ctgttgccaa | ccgcgtctcg | tatctgctcg | acctgaaggg | gccgagcatg | 7020 |
| 50 | cccgtggaca | ccatgtgctc | ggcctcgctg | acagccgtcc | acatggcttg | cgaggcgctg | 7080 |
| | caacgaggcg | cctgcgtcat | ggccatcgcg | ggtggagtga | atctctacgt | ccacccgtcg | 7140 |
| | agctacgtca | gcctgtccgg | gcagcagatg | ctgtcgac | | | 7178 |

55 <210> 3
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 <212> Amino acid
 <213> Myxococcus xanthus

60 <400> 3
 Met Lys Val Val Asn Lys Leu Leu Glu Lys Leu Pro Asp Val Val Ala

| | 1 | 5 | 10 | 15 |
|----|-----------------------------|-----------------------------|-------------------------|---|
| | Gly | Lys Val | Pro Asp Val | Lys Leu Gln Asp Gln Asp Ile Lys Val Pro |
| | | 20 | 25 | 30 |
| 5 | Leu | Ala Gln Gly Thr Phe Thr | Glu Glu Lys Ile | Leu Pro Pro Lys Leu |
| | | 35 | 40 | 45 |
| 10 | Ala Met His Gly Phe Thr | Leu Ser Phe Glu | Ala Thr Gly Glu | Ala Ser |
| | 50 | 55 | 60 | |
| | Ile Arg Asn Phe Asn Ser | Leu Gly Asp Val | Asp Glu Asn Gly Ile Ile | |
| | 65 | 70 | 75 | 80 |
| 15 | Gly Glu Pro Ser Pro Glu Ser | Ala Glu Pro Gly Pro Arg | Pro Gln Leu | |
| | | 85 | 90 | 95 |
| | Leu Leu Gly Ser Asp Ile Gly | Trp Met Arg Tyr Gln Val Ser | Ala Arg | |
| | | 100 | 105 | 110 |
| 20 | Val Lys Ala Ala Val Ser | Ala Ser Leu Ser Phe | Leu Ala Ser Glu Asn | |
| | | 115 | 120 | 125 |
| | Gln Thr Glu Leu Ser Val Thr | Leu Ser Asp Tyr Arg | Ala His Pro Leu | |
| 25 | | 130 | 135 | 140 |
| | Gly Gln Asn Met Arg Glu | Ala Val Arg Ser Asp | Leu Ser Glu Leu Arg | |
| | | 145 | 150 | 155 |
| | Leu Met Gln Ala Thr Asp | Leu Ala Lys Leu Thr Thr | Gly Asp Ala Val | |
| 30 | | 165 | 170 | 175 |
| | Ala Trp His Val Arg Gly | Ala Leu His Thr Arg | Leu Glu Leu Asn Trp | |
| | | 180 | 185 | 190 |
| 35 | Ala Asp Ile Phe Pro Thr | Asn Leu Asn Arg Leu Gly | Phe Leu Arg Gly | |
| | | 195 | 200 | 205 |
| | Asn Glu Leu Leu Ala Leu | Lys Thr Ser Ala Lys | Ala Gly Leu Ser Ala | |
| 40 | | 210 | 215 | 220 |
| | Arg Val Ser Leu Thr Asp | Asp Tyr Gln Leu Ser Phe | Ser Arg Pro Arg | |
| | | 225 | 230 | 235 |
| | Ala Gly Arg Ile Gln Val | Ala Val Arg Lys Val Lys | Ser His Glu Gln | |
| 45 | | 245 | 250 | 255 |
| | Ala Leu Ser Ala Gly Leu | Gly Ile Thr Val Glu | Leu Leu Asp Pro Ala | |
| | | 260 | 265 | 270 |
| 50 | Thr Val Lys Ala Gln Leu | Gly Gln Leu Leu Glu | Ala Leu Leu Gly Pro | |
| | | 275 | 280 | 285 |
| | Val Leu Arg Asp Leu Val | Lys Lys Gly Thr Thr | Ala Val Glu Ile Met | |
| 55 | | 290 | 295 | 300 |
| | Asp Gly Leu Val Asp Lys | Ala Ser Lys Ala Lys | Leu Asp Asp Asn Gln | |
| | | 305 | 310 | 315 |
| 60 | Lys Lys Val Leu Gly Leu | Val Leu Glu Arg Leu Gly | Ile Asp Pro Gln | |
| | | 325 | 330 | 335 |

Leu Ala Asp Pro Ala Asn Leu Pro Gln Ala Trp Ala Asp Phe Lys Ala
 340 345 350

5 Arg Val Ala Glu Ser Leu Glu Asn Ala Val Arg Thr Gln Val Ala Glu
 355 360 365

Gly Phe Glu Tyr Glu Tyr Leu Arg Leu Ser Glu Thr Ser Thr Leu Leu
 370 375 380

10 Glu Val Val Val Glu Asp Val Thr Ala Met Arg Phe His Glu Ser Leu
 385 390 395 400

15 Leu Lys Gly Asn Leu Val Glu Leu Leu Lys Trp Met Lys Ser Leu Pro
 405 410 415

Ala Gln Gln Ser Glu Phe Glu Leu Arg Asn Tyr Leu His Ala Thr Thr
 420 425 430

20 Leu Thr Arg Gln Gln Ala Ile Gly Phe Ser Leu Gly Leu Gly Ser Phe
 435 440 445

Glu Leu Leu Lys Ala Lys Asn Val Ser Lys Gln Ser Trp Val Thr Gln
 450 455 460

25 Glu Asn Phe Gln Gly Ala Arg Arg Met Ala Phe Leu Gly Arg Arg Gly
 465 470 475 480

30 Tyr Glu Asp Lys Leu Leu Gly Thr Arg Gly Gln Trp Val Val Asp Leu
 485 490 495

Lys Ala Asp Met Thr Arg Phe Ser Pro Thr Pro Val Ala Ser Asp Phe
 500 505 510

35 Gly Tyr Gly Leu His Leu Met Leu Trp Gly Arg Gln Lys Lys Leu Ser
 515 520 525

Arg Lys Asp Leu Gln Gln Ala Val Asp Asp Ala Val Val Trp Gly Val
 530 535 540

40 Leu Asp Ala Lys Asp Ala Ala Thr Val Ile Ser Thr Met Gln Glu Asp
 545 550 555 560

45 Met Gly Lys His Pro Ile Glu Thr Arg Leu Glu Leu Lys Met Ala Asp
 565 570 575

Asp Ser Phe Arg Ala Leu Val Pro Arg Ile Gln Thr Leu Glu Leu Ser
 580 585 590

50 Arg Phe Ser Arg Ala Leu Ala Arg Ala Leu Pro Trp Ser Glu Gln Leu
 595 600 605

Pro Arg Ala Ser Ala Glu Phe Arg Arg Ala Val Tyr Ala Pro Ile Trp
 610 615 620

55 Glu Ala Tyr Leu Arg Glu Val Gln Glu Gln Gly Ser Leu Met Leu Asn
 625 630 635 640

60 Asp Leu Ser Pro Ser Arg Ala Ala Gln Ile Ala Lys Trp Tyr Phe Gln
 645 650 655

Lys Asp Pro Thr Val Arg Asp Leu Gly Lys Asp Leu Gln Leu Ile Glu
 660 665 670

5 Ser Glu Trp Arg Pro Gly Gly Gly Asn Phe Ser Phe Ala Glu Val Ile
 675 680 685

Ser Lys Asn Pro Asn Thr Leu Met Arg Cys Arg Asn Phe Val Ser Gly
 690 695 700

10 Met Val Arg Leu Arg Arg Ala Ile Asp Glu Arg Lys Ala Pro Asp Glu
 705 710 715 720

Leu Arg Thr Val Phe Gly Glu Leu Glu Gly Met Trp Thr Thr Gly Phe
 725 730 735

15 His Leu Arg Ala Ala Gly Ser Leu Leu Ser Asp Leu Ala Gln Ser Thr
 740 745 750

20 Pro Leu Gly Leu Ala Gly Val Glu Arg Thr Leu Thr Val Arg Val Ala
 755 760 765

Asp Ser Glu Glu Gln Leu Val Phe Ser Thr Ala Arg Ser Thr Gly Ala
 770 775 780

25 Ala
 785

30 <210> 4
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 <212> Amino acid
 <213> Myxococcus xanthus

35 <400> 4
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Leu Pro Ala Met Pro Gln Ala Pro Ser Asp Val Ser Gln Val Leu Leu
 20 25 30

40 Pro Phe Gly Gly Leu Val Gly Arg Glu Val Asp Leu Asp Ala Phe Leu
 35 40 45

45 Gln Thr Leu Met Asp Arg Ile Ala Ile Thr Leu Gln Ala Asp Arg Gly
 50 55 60

Thr Leu Trp Leu Leu Asp Pro Ala Arg Arg Glu Leu Phe Ser Arg Ala
 65 70 75 80

50 Ala His Leu Pro Glu Val Ser Gln Ile Arg Val Lys Leu Gly Gln Gly
 85 90 95

Val Ala Gly Thr Val Ala Lys Ala Gly His Ala Ile Asn Val Pro Asp
 100 105 110

55 Pro Arg Gly Glu Gln Arg Phe Phe Ala Asp Ile Asp Arg Met Thr Gly
 115 120 125

60 Tyr Arg Thr Thr Ser Leu Leu Ala Val Pro Leu Arg Asp Gly Asp Gly
 130 135 140

Ala Leu Tyr Gly Val Leu Gln Val Leu Asn Arg Arg Gly Glu Asp Arg
 145 150 155 160

5 Phe Thr Asp Glu Asp Thr Gln Arg Leu Thr Ala Ile Ala Ser Gln Val
 165 170 175

Ser Thr Ala Leu Gln Ser Thr Ser Leu Tyr Gln Glu Leu Gln Arg Ala
 180 185 190

10 Lys Glu Gln Pro Gln Val Pro Val Gly Tyr Phe Phe Asn Arg Ile Ile
 195 200 205

Gly Glu Ser Pro Gln Leu Gln Ala Ile Tyr Arg Leu Val Arg Lys Ala
 210 215 220

15 Ala Pro Thr Asp Ala Thr Val Leu Leu Arg Gly Glu Ser Gly Ser Gly
 225 230 235 240

20 Lys Glu Leu Phe Ala Arg Ala Val His Val Asn Gly Pro Arg Arg Asp
 245 250 255

Gln Pro Phe Ile Lys Val Asp Cys Ala Ala Leu Pro Ala Thr Leu Ile
 260 265 270

25 Glu Asn Glu Leu Phe Gly His Glu Arg Gly Ala Phe Thr Gly Ala Asp
 275 280 285

His Arg Val Pro Gly Lys Phe Glu Ala Ala Ser Gly Gly Thr Val Phe
 290 295 300

30 Ile Asp Glu Ile Gly Glu Leu Pro Leu Pro Val Gln Gly Lys Leu Leu
 305 310 315 320

35 Arg Val Ile Gln Asp Arg Glu Phe Glu Arg Val Gly Gly Thr Gln Ala
 325 330 335

Val Lys Val Asp Val Arg Ile Val Ala Ala Thr His Arg Asp Leu Ala
 340 345 350

40 Arg Met Val Ala Glu Gly Arg Phe Arg Glu Asp Leu Tyr Tyr Arg Ile
 355 360 365

Lys Val Val Glu Val Val Leu Pro Pro Leu Arg Glu Arg Gly Ala Glu
 370 375 380

45 Asp Ile Glu Arg Leu Ala Arg His Phe Val Ala Ala Val Ala Arg Arg
 385 390 395 400

50 His Arg Leu Thr Pro Pro Arg Leu Ser Ala Ala Ala Val Glu Arg Leu
 405 410 415

Lys Arg Tyr Arg Trp Pro Gly Asn Val Arg Glu Leu Glu Asn Cys Ile
 420 425 430

55 Glu Ser Ala Val Val Leu Cys Glu Gly Glu Ile Leu Glu Glu His Leu
 435 440 445

Pro Leu Pro Asp Val Asp Arg Ala Ala Leu Pro Pro Pro Ala Ala Ala
 450 455 460

60 Gln Gly Val Asn Ala Pro Thr Ala Pro Ala Pro Leu Asp Ala Gly Leu

465 470 475 480
 Leu Pro Leu Ala Glu Val Glu Arg Arg His Ile Leu Arg Val Leu Asp
 485 490 495
 5 Ala Val Lys Gly Asn Arg Thr Ala Ala Ala Arg Val Leu Ala Ile Gly
 500 505 510
 10 Arg Asn Thr Leu Ala Arg Lys Leu Lys Glu Tyr Gly Leu Gly Asp Glu
 515 520 525
 Pro
 15 <210> 5
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 <212> Amino acid
 <213> Myxococcus xanthus
 20 <400> 5
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 25 Glu Val Arg Phe His Gly Val Arg Gly Ser Ile Ala Val Ser Gly Ser
 20 25 30
 Arg Ile Gly Gly Asn Thr Ala Cys Val Glu Val Thr Ser Gln Gly His
 35 40 45
 30 Arg Leu Ile Leu Asp Ala Gly Thr Gly Ile Arg Ala Leu Gly Glu Ile
 50 55 60
 35 Met Met Arg Glu Gly Ala Pro Gln Glu Ala Thr Leu Phe Phe Ser His
 65 70 75 80
 Leu His Trp Asp His Val Gln Gly Phe Pro Phe Phe Thr Pro Ala Trp
 85 90 95
 40 Leu Pro Thr Ser Glu Leu Thr Leu Tyr Gly Pro Gly Ala Asn Gly Ala
 100 105 110
 Gln Ala Leu Gln Ser Glu Leu Ala Ala Gln Met Gln Pro Leu His Phe
 115 120 125
 45 Pro Val Pro Leu Ser Thr Met Arg Ser Arg Met Asp Phe Arg Ser Ala
 130 135 140
 50 Leu His Ala Arg Pro Val Glu Val Gly Pro Phe Arg Val Thr Pro Ile
 145 150 155 160
 Asp Val Pro His Pro Gln Gly Cys Leu Ala Tyr Arg Leu Glu Ala Asp
 165 170 175
 55 Gly His Ser Phe Val Tyr Ala Thr Asp Val Glu Val Arg Val Gln Glu
 180 185 190
 Leu Ala Pro Glu Val Gly Arg Leu Phe Glu Gly Ala Asp Val Leu Cys
 195 200 205
 60 Leu Asp Ala Gln Tyr Thr Pro Asp Glu Tyr Glu Gly Arg Lys Gly Val

210 215 220
 5 Ala Lys Lys Gly Trp Gly His Ser Thr Met Met Asp Ala Ala Gly Val
 225 230 235 240
 Ala Gly Leu Val Gly Ala Arg Arg Leu Cys Leu Phe His His Asp Pro
 245 250 255
 10 Ala His Gly Asp Asp Met Leu Glu Asp Met Ala Glu Gln Ala Arg Ala
 260 265 270
 Leu Phe Pro Val Cys Glu Pro Ala Arg Glu Gly Gln Arg Leu Val Leu
 275 280 285
 15 Gly Arg Ala Ala
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 20 <210> 6
 <211> 168
 <212> Amino acid
 <213> Myxococcus xanthus
 <400> 6
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 1 5 10 15
 Arg Val Asn His Glu Lys Val Ala Ala Ala Gln Leu Gly Lys His Gly
 20 25 30
 30 Tyr Glu Phe Phe Leu Pro Thr Tyr Thr Pro Pro Lys Ser Ser Gly Val
 35 40 45
 35 Lys Ala Lys Leu Pro Leu Phe Pro Gly Tyr Leu Phe Cys Arg Tyr Gln
 50 55 60
 Pro Leu Asn Pro Tyr Arg Ile Val Arg Ala Pro Gly Val Ile Arg Leu
 65 70 75 80
 40 Leu Gly Gly Asp Ala Gly Pro Glu Ala Val Pro Ala Gln Glu Leu Glu
 85 90 95
 Ala Ile Arg Arg Val Ala Asp Ser Gly Val Ser Ser Asn Pro Cys Asp
 100 105 110
 45 Tyr Leu Arg Val Gly Gln Arg Val Arg Ile Ile Glu Gly Pro Leu Thr
 115 120 125
 50 Gly Leu Glu Gly Ser Leu Val Thr Ser Lys Ser Gln Leu Arg Phe Ile
 130 135 140
 Val Ser Val Gly Leu Leu Gln Arg Ser Val Ser Val Glu Val Ser Ala
 145 150 155 160
 55 Glu Gln Leu Glu Pro Ile Thr Asp
 165
 60 <210> 7
 <211> 79
 <212> Amino acid

<213> Myxococcus xanthus

<400> 7

5 Met Asp Lys Arg Ile Ile Phe Asp Ile Val Thr Ser Ser Val Arg Glu
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Val Val Pro Glu Leu Glu Ser His Pro Phe Glu Pro Glu Asp Asp Leu
20 25 30
10 Val Gly Leu Gly Ala Asn Ser Leu Asp Arg Ala Glu Ile Val Asn Leu
35 40 45
Thr Leu Glu Lys Leu Ala Leu Asn Ile Pro Arg Val Glu Leu Ile Asp
50 55 60
15 Ala Lys Thr Ile Gly Gly Leu Val Asp Val Leu His Ala Arg Leu
65 70 75

20 <210> 8
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<212> Amino acid
<213> Myxococcus xanthus

25 <400> 8

Met Gly Pro Val Gly Ile Glu Ala Met Asn Ala Tyr Cys Gly Ile Ala
1 5 10 15
30 Arg Leu Asp Val Leu Gln Leu Ala Thr His Arg Gly Leu Asp Thr Ser
20 25 30
Arg Phe Ala Asn Leu Leu Met Glu Glu Lys Thr Val Pro Leu Pro Tyr
35 40 45
35 Glu Asp Pro Val Thr Tyr Gly Val Asn Ala Ala Arg Pro Ile Leu Asp
50 55 60
Gln Leu Thr Ala Ala Glu Arg Asp Ser Ile Glu Leu Leu Val Ala Cys
65 70 75 80
40 Thr Glu Ser Ser Phe Asp Phe Gly Lys Ala Met Ser Thr Tyr Leu His
85 90 95
45 Gln His Leu Gly Leu Ser Arg Asn Cys Arg Leu Ile Glu Leu Lys Ser
100 105 110
Ala Cys Tyr Ser Gly Val Ala Gly Leu Gln Met Ala Val Asn Phe Ile
115 120 125
50 Leu Ser Gly Val Ser Pro Gly Ala Lys Ala Leu Val Val Ala Ser Asp
130 135 140
Leu Ser Arg Phe Ser Ile Ala Glu Gly Gly Asp Ala Ser Thr Glu Asp
145 150 155 160
55 Trp Ser Phe Ala Glu Pro Ser Ser Gly Ala Gly Ala Val Ala Met Leu
165 170 175
60 Val Ser Asp Thr Pro Arg Val Phe Arg Val Asp Val Gly Ala Asn Gly
180 185 190

Tyr Tyr Gly Tyr Glu Val Met Asp Thr Cys Arg Pro Val Ala Asp Ser
 195 200 205
 5 Glu Ala Gly Asp Ala Asp Leu Ser Leu Leu Ser Tyr Leu Asp Cys Cys
 210 215 220
 Glu Asn Ala Phe Arg Glu Tyr Thr Arg Arg Val Pro Ala Ala Asn Tyr
 225 230 235 240
 10 Ala Glu Ser Phe Gly Tyr Leu Ala Phe His Thr Pro Phe Gly Gly Met
 245 250 255
 Val Lys Gly Ala His Arg Thr Met Met Arg Lys Phe Ser Gly Lys Asn
 260 265 270
 15 Arg Gly Asp Ile Glu Ala Asp Phe Gln Arg Arg Val Ala Pro Gly Leu
 275 280 285
 20 Thr Tyr Cys Gln Arg Val Gly Asn Ile Met Gly Ala Thr Met Ala Leu
 290 295 300
 Ser Leu Leu Gly Thr Ile Asp His Gly Asp Phe Ala Thr Ala Lys Arg
 305 310 315 320
 25 Ile Gly Cys Phe Ser Tyr Gly Ser Gly Cys Ser Ser Glu Phe Phe Ser
 325 330 335
 Gly Val Val Thr Glu Glu Gly Gln Gln Arg Gln Arg Ala Leu Gly Leu
 340 345 350
 30 Gly Glu Ala Leu Gly Arg Arg Gln Gln Leu Ser Met Pro Asp Tyr Asp
 355 360 365
 35 Ala Leu Leu Lys Gly Asn Gly Leu Val Arg Phe Gly Thr Arg Asn Ala
 370 375 380
 Glu Leu Asp Phe Gly Val Val Gly Ser Ile Arg Pro Gly Gly Trp Gly
 385 390 395 400
 40 Arg Pro Leu Leu Phe Leu Ser Ala Ile Arg Asp Phe His Arg Asp Tyr
 405 410 415
 Gln Trp Ile Ser
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 50 <213> Myxococcus xanthus
 <400> 9
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 20 25 30
 60 Leu Phe Ala Gly Gln Ile Gly Asp Trp Ala Trp Asp Thr Val Ser Arg
 35 40 45

Leu Cys Gly Thr Asp Val Leu Thr Ala Thr Asn Ala Ser Gly Ala Pro
 50 55 60

5 Thr Tyr Leu Ala Phe Tyr Tyr Phe Arg Ile Arg Gly Thr Pro Ala Leu
 65 70 75 80

His Pro Gly Ala Leu Arg Phe Gly Asp Thr Leu Asp Val Thr Ser Lys
 85 90 95

10 Ala Tyr Asn Phe Gly Ser Glu Ser Val Leu Thr Val His Arg Ile Cys
 100 105 110

Lys Thr Ala Glu Gly Gly Ala Pro Glu Ala Asp Ala Phe Gly His Glu
 115 120 125

15 Glu Leu Tyr Glu Gln Pro Gln Pro Gly Arg Ile Tyr Ala Glu Thr Phe
 130 135 140

20 Asn Arg Trp Ile Thr Arg Ser Asp Gly Lys Ser Asn Glu Ser Leu Ile
 145 150 155 160

Lys Ser Ser Pro Val Gly Phe Gln Tyr Ala His Leu Pro Leu Leu Pro
 165 170 175

25 Asp Glu Tyr Ser Pro Arg Arg Ala Tyr Gly Asp Ala Arg Ala Arg Gly
 180 185 190

Thr Phe His Asp Val Asp Ser Ala Glu Tyr Arg Leu Thr Val Asp Arg
 195 200 205

30 Phe Pro Leu Arg Tyr Ala Val Asp Val Ile Arg Asp Val Asn Gly Val
 210 215 220

35 Gly Leu Ile Tyr Phe Ala Ser Tyr Phe Ser Met Val Asp Trp Ala Ile
 225 230 235 240

Trp Gln Leu Ala Arg His Gln Gly Arg Ser Glu Gln Ala Phe Leu Ser
 245 250 255

40 Arg Val Val Leu Asp Gln Gln Leu Cys Phe Leu Gly Asn Ala Ala Leu
 260 265 270

Asp Thr Thr Phe Asp Ile Asp Val Gln His Trp Glu Arg Val Gly Gly
 275 280 285

45 Gly Glu Glu Leu Phe Asn Val Lys Met Arg Glu Gly Ala Gln Gly Arg
 290 295 300

50 Asp Ile Ala Val Ala Thr Val Lys Val Arg Phe Asp Ala Ala Ser Glu
 305 310 315 320

Gly Gly Arg Arg Gly
 325

55

<210> 10
 <211> 83
 <212> Amino acid
 <213> Myxococcus xanthus

60

<400> 10

Met Thr Asp Glu Gln Ile Arg Gly Val Val His Gln Ser Ile Val Arg
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 Val Leu Pro Arg Val Arg Ser Asn Glu Ile Ala Gly His Leu Asn Leu
 5 20 25 30
 Arg Glu Leu Gly Ala Asp Ser Val Asp Arg Val Glu Ile Leu Thr Ser
 35 40 45
 Ile Leu Asp Ser Leu Arg Leu Gln Lys Thr Pro Leu Ala Lys Phe Ala
 10 50 55 60
 Asp Ile Arg Asn Ile Asp Ala Leu Val Ala Phe Leu Ala Gly Glu Val
 65 70 75 80
 15 Ala Gly Gly
 20 <210> 11
 <211> 374
 <212> Amino acid
 <213> Myxococcus xanthus
 25 <400> 11
 Met Met Gln Glu Arg Gly Val Ala Leu Pro Phe Glu Asp Pro Val Thr
 1 5 10 15
 Asn Ala Val Asn Ala Ala Arg Pro Ile Leu Asp Ala Met Ser Pro Glu
 30 20 25 30
 Ala Arg Glu Arg Ile Glu Leu Leu Val Thr Ser Ser Glu Ser Gly Val
 35 35 40 45
 Asp Phe Ser Lys Ser Ile Ser Ser Tyr Ala His Glu His Leu Gly Leu
 50 55 60
 Ser Arg His Cys Arg Phe Leu Glu Val Lys Gln Ala Cys Tyr Ala Ala
 40 65 70 75 80
 Thr Gly Ala Leu Gln Leu Ala Leu Gly Tyr Ile Ala Ser Gly Val Ser
 85 90 95
 Pro Gly Ala Lys Ala Leu Val Ile Ala Thr Asp Val Thr Leu Val Asp
 45 100 105 110
 Glu Ser Gly Leu Tyr Ser Glu Pro Ala Met Gly Thr Gly Gly Val Ala
 115 120 125
 Val Leu Leu Gly Asp Glu Pro Arg Val Met Lys Met Asp Leu Gly Ala
 50 130 135 140
 Phe Gly Asn Tyr Ser Tyr Asp Val Phe Asp Thr Ala Arg Pro Ser Pro
 145 150 155 160
 55 Glu Ile Asp Ile Gly Asp Val Asp Arg Ser Leu Phe Thr Tyr Leu Asp
 165 170 175
 Cys Leu Lys His Ser Phe Ala Ala Tyr Gly Arg Arg Val Asp Gly Val
 60 180 185 190

Asp Phe Val Ser Thr Phe Asp Tyr Leu Ala Met His Thr Pro Phe Ala
 195 200 205
 5 Gly Leu Val Lys Ala Gly His Arg Lys Met Met Arg Glu Leu Thr Pro
 210 215 220
 Cys Asp Val Asp Glu Ile Glu Ala Asp Phe Gly Arg Arg Val Lys Pro
 225 230 235 240
 10 Ser Leu Gln Tyr Pro Ser Leu Val Gly Asn Leu Cys Ser Gly Ser Val
 245 250 255
 Tyr Leu Ser Leu Cys Ser Ile Ile Asp Thr Ile Lys Pro Glu Arg Ser
 260 265 270
 15 Ala Arg Val Gly Met Phe Ser Tyr Gly Ser Gly Cys Ser Ser Glu Phe
 275 280 285
 20 Phe Ser Gly Val Ile Gly Pro Glu Ser Val Ser Ala Leu Ala Gly Leu
 290 295 300
 Asp Ile Gly Gly His Leu Arg Gly Arg Arg Gln Leu Thr Phe Asp Gln
 305 310 315 320
 25 Tyr Val Glu Leu Leu Lys Glu Asn Leu Arg Cys Leu Val Pro Thr Lys
 325 330 335
 Asn Arg Asp Val Asp Val Glu Arg Tyr Leu Pro Leu Val Thr Arg Thr
 340 345 350
 30 Ala Ser Arg Pro Arg Met Leu Ala Leu Arg Arg Val Val Asp Tyr His
 355 360 365
 35 Arg Gln Tyr Glu Trp Val
 370
 <210> 12
 <211> 171
 40 <212> Amino acid
 <213> Myxococcus xanthus
 <400> 12
 45 Met Asn Thr Pro Ser Leu Thr Asn Trp Pro Ala Arg Leu Gly Tyr Leu
 1 5 10 15
 Leu Ala Val Gly Gly Ala Trp Phe Ala Ala Asp Gln Val Thr Lys Gln
 20 25 30
 50 Met Ala Arg Asp Gly Ala Lys Arg Pro Val Ala Val Phe Asp Ser Trp
 35 40 45
 Trp His Phe His Tyr Val Glu Asn Arg Ala Gly Ala Phe Gly Leu Phe
 50 55 60
 55 Ser Ser Phe Gly Glu Glu Trp Arg Met Pro Phe Phe Tyr Val Val Gly
 65 70 75 80
 60 Ala Ile Cys Ile Val Leu Leu Ile Gly Tyr Tyr Phe Tyr Thr Pro Pro
 85 90 95

Thr Met Lys Leu Gln Arg Trp Ser Leu Ala Thr Met Ile Gly Gly Ala
 100 105 110
 5 Leu Gly Asn Tyr Val Asp Arg Val Arg Leu Arg Tyr Val Val Asp Phe
 115 120 125
 Val Ser Trp His Val Gly Asp Arg Phe Tyr Trp Pro Ser Phe Asn Ile
 130 135 140
 10 Ala Asp Thr Ala Val Val Val Gly Ala Ala Leu Met Ile Leu Glu Ser
 145 150 155 160
 Phe Arg Glu Pro Arg Gln Gln Leu Ser Pro Gly
 165 170
 15
 <210> 13
 <211> 475
 <212> Amino acid
 20 <213> Myxococcus xanthus
 <400> 13
 Met Gly Thr Ser Glu Pro Val Glu Pro Asp His Ala Leu Ser Lys Pro
 1 5 10 15
 25 Pro Pro Val Ala Pro Val Gly Ala Gln Ala Leu Pro Arg Gly Pro Ala
 20 25 30
 30 Met Pro Gly Ile Ala Gln Leu Met Met Leu Phe Leu Arg Pro Thr Glu
 35 40 45
 Phe Leu Asp Arg Cys Ala Ala Arg Tyr Gly Asp Thr Phe Thr Leu Lys
 50 55 60
 35 Ile Pro Gly Thr Pro Pro Phe Ile Gln Thr Ser Asp Pro Ala Leu Ile
 65 70 75 80
 Glu Val Ile Phe Lys Gly Asp Pro Asp Leu Phe Leu Gly Gly Lys Ala
 85 90 95
 40 Asn Asn Gly Leu Lys Pro Val Val Gly Glu Asn Ser Leu Leu Val Leu
 100 105 110
 Asp Gly Lys Arg His Arg Arg Asp Arg Lys Leu Ile Met Pro Thr Phe
 115 120 125
 45 Leu Gly Glu Arg Met His Ala Tyr Gly Ser Val Ile Arg Asp Ile Val
 130 135 140
 50 Asn Ala Ala Leu Asp Arg Trp Pro Val Gly Lys Pro Phe Ala Val His
 145 150 155 160
 Glu Glu Thr Gln Gln Ile Met Leu Glu Val Ile Leu Arg Val Ile Phe
 165 170 175
 55 Gly Leu Glu Asp Ala Arg Thr Ile Ala Gln Phe Arg His His Val His
 180 185 190
 Gln Val Leu Lys Leu Ala Leu Phe Leu Phe Pro Asn Gly Glu Gly Lys
 195 200 205
 60

Pro Ala Ala Glu Gly Phe Ala Arg Ala Val Gly Lys Ala Phe Pro Ser
 210 215 220

5 Leu Asp Val Phe Ala Ser Leu Lys Ala Ile Asp Asp Ile Ile Tyr Gln
 225 230 235 240

Glu Ile Gln Asp Arg Arg Ser Gln Asp Ile Ser Gly Arg Gln Asp Val
 245 250 255

10 Leu Ser Leu Met Met Gln Ser His Tyr Asp Asp Gly Ser Val Met Thr
 260 265 270

Pro Gln Glu Leu Arg Asp Glu Leu Met Thr Leu Leu Met Ala Gly His
 275 280 285

15 Glu Thr Ser Ala Thr Ile Ala Ala Trp Cys Val Tyr His Leu Cys Arg
 290 295 300

20 His Pro Asp Ala Met Gly Lys Leu Arg Glu Glu Ile Ala Ala His Thr
 305 310 315 320

Val Asp Gly Val Leu Pro Leu Ala Lys Ile Asn Glu Leu Lys Phe Leu
 325 330 335

25 Asp Ala Val Val Lys Glu Thr Met Arg Ile Thr Pro Val Phe Ser Leu
 340 345 350

Val Ala Arg Val Leu Lys Glu Pro Gln Thr Ile Gly Gly Thr Thr Tyr
 355 360 365

30 Pro Ala Asn Val Val Leu Ser Pro Asn Ile Tyr Gly Thr His His Arg
 370 375 380

35 Ala Asp Leu Trp Gly Asp Pro Lys Val Phe Arg Pro Glu Arg Phe Leu
 385 390 395 400

Glu Glu Arg Val Asn Pro Phe His Tyr Phe Pro Phe Gly Gly Gly Ile
 405 410 415

40 Arg Lys Cys Ile Gly Thr Ser Phe Ala Tyr Tyr Glu Met Lys Ile Phe
 420 425 430

Val Ser Glu Thr Val Arg Arg Met Arg Phe Asp Thr Arg Pro Gly Tyr
 435 440 445

45 His Ala Lys Val Val Arg Arg Ser Asn Thr Leu Ala Pro Ser Gln Gly
 450 455 460

50 Val Pro Ile Ile Val Glu Ser Arg Leu Pro Ser
 465 470 475

55 <210> 14
 <211> 318
 <212> Amino acid
 <213> Myxococcus xanthus

<400> 14

60 Met Val Asp Ser Val Ser Lys Gln Ala Arg Arg Lys Val Phe Leu Phe
 1 5 10 15

Ser Gly Gln Gly Thr Gln Ser Tyr Phe Met Ala Lys Glu Leu Phe Asp
 20 25 30
 5 Thr Gln Thr Gly Phe Lys Arg Gln Leu Leu Glu Leu Asp Glu Gln Phe
 35 40 45
 Lys Gln Arg Leu Gly His Ser Ile Leu Glu Arg Ile Tyr Asp Ala Arg
 50 55 60
 10 Ala Ala Arg Leu Asp Pro Leu Asp Asp Val Leu Val Ser Phe Pro Ala
 65 70 75 80
 Ile Phe Met Ile Glu His Ala Leu Ala Arg Leu Leu Ile Asp Arg Gly
 85 90 95
 15 Ile Gln Pro Asp Ala Val Val Gly Ala Ser Met Gly Glu Val Ala Ala
 100 105 110
 20 Ala Ala Ile Ala Gly Ala Ile Ser Val Asp Ala Ala Val Ala Leu Val
 115 120 125
 Ala Ala Gln Ala Gln Leu Phe Ala Arg Thr Ala Pro Arg Gly Gly Met
 130 135 140
 25 Leu Ala Val Leu His Glu Leu Glu Ala Cys Arg Gly Phe Thr Ser Val
 145 150 155 160
 Ala Arg Asp Gly Glu Val Ala Ala Ile Asn Tyr Pro Ser Asn Phe Val
 165 170 175
 30 Leu Ala Ala Asp Glu Ala Gly Leu Gly Arg Ile Gln Gln Glu Leu Ser
 180 185 190
 35 Gln Arg Ser Val Ala Phe His Arg Leu Pro Val Arg Tyr Pro Phe His
 195 200 205
 Ser Ser His Leu Asp Pro Leu Arg Glu Glu Tyr Arg Ser Arg Val Arg
 210 215 220
 40 Ala Asp Ser Leu Thr Trp Pro Arg Ile Pro Met Tyr Ser Cys Thr Thr
 225 230 235 240
 45 Ala Asn Arg Val His Asp Leu Arg Ser Asp His Phe Trp Asn Val Val
 245 250 255
 Arg Ala Pro Ile Gln Leu Tyr Asp Thr Val Leu Gln Leu Glu Gly Gln
 260 265 270
 50 Gly Gly Cys Asp Phe Ile Asp Val Gly Pro Ala Ala Ser Phe Ala Thr
 275 280 285
 Ile Ile Lys Arg Ile Leu Ala Arg Asp Ser Thr Ser Arg Leu Phe Pro
 290 295 300
 55 Leu Leu Ser Pro Ser Pro Ala Ser Thr Gly Ser Ser Met Gly
 305 310 315
 60 <210> 15
 <211> 330

<212> Amino acid

<213> Myxococcus xanthus

<400> 15

5 Met Thr Glu Ala Pro Ala Pro Arg Ala Pro Ala Gln Val Pro Pro Pro
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Pro Ser Ser Pro Trp Ala Leu His Thr Arg Gly Ala Ala Ser Ala Pro
20 25 30

10 Val Asn Ala Arg Lys Ala Ala Leu Phe Pro Gly Gln Gly Ser Gln Glu
35 40 45

15 Arg Gly Met Gly Ala Ala Leu Phe Asp Glu Phe Pro Asp Leu Thr Asp
50 55 60

Ile Ala Asp Ala Ile Leu Gly Tyr Ser Ile Lys Arg Leu Cys Leu Glu
65 70 75 80

20 Asp Pro Gly Lys Glu Leu Ala Gln Thr Gln Phe Thr Gln Pro Ala Leu
85 90 95

Tyr Val Val Asn Ala Leu Ser Tyr Leu Lys Arg Leu Arg Glu Gly Ala
100 105 110

25 Glu Gln Pro Ala Phe Val Ala Gly His Ser Leu Gly Glu Tyr Asn Ala
115 120 125

30 Leu Leu Val Ala Gly Ala Phe Asp Phe Glu Thr Gly Leu Arg Leu Val
130 135 140

Lys Arg Arg Gly Glu Leu Met Ser Gly Ala Ser Gly Gly Thr Met Ala
145 150 155 160

35 Ala Val Val Gly Cys Asp Ala Val Ala Val Glu Gln Val Leu Arg Asp
165 170 175

Arg Gln Leu Thr Ser Leu Asp Ile Ala Asn Ile Asn Ser Pro Asp Gln
180 185 190

40 Ile Val Val Ser Gly Pro Ala Gln Asp Ile Glu Arg Ala Arg Gln Cys
195 200 205

Phe Val Asp Arg Gly Ala Arg Tyr Val Pro Leu Asn Val Arg Ala Pro
210 215 220

Phe His Ser Arg Tyr Met Gln Pro Ala Ala Ser Glu Phe Glu Arg Phe
225 230 235 240

50 Leu Ser Gln Phe Gln Tyr Ala Pro Leu Arg Cys Val Val Ile Ser Asn
245 250 255

Val Thr Gly Arg Pro Tyr Ala His Asp Asn Val Val Gln Gly Leu Ala
260 265 270

55 Leu Gln Leu Arg Ser Pro Val Gln Trp Thr Ala Thr Val Arg Tyr Leu
275 280 285

60 Leu Glu Gln Gly Val Glu Asp Phe Glu Glu Leu Gly Pro Gly Arg Val
290 295 300

Leu Thr Arg Leu Ile Thr Ala Asn Lys Arg Gly Ala Pro Ala Pro Ala
 305 310 315 320
 5 Thr Ala Ala Pro Ala Lys Trp Ala Asn Ala
 325 330
 <210> 16
 <211> 417
 10 <212> Amino acid
 <213> Myxococcus xanthus
 <400> 16
 15 Met Ser Thr Ser Pro Val Gln Glu Leu Val Val Ser Gly Phe Gly Val
 1 5 10 15
 Thr Ser Ala Ile Gly Gln Gly Ala Ala Ser Phe Thr Ser Ala Leu Leu
 20 20 25 30
 Glu Gly Ala Ala Arg Phe Arg Val Met Glu Arg Pro Gly Arg Gln His
 35 40 45
 Gln Ala Asn Gly Gln Thr Thr Ala His Leu Gly Ala Glu Ile Ala Ser
 50 55 60
 25 Leu Ala Val Pro Glu Gly Val Thr Pro Gln Leu Trp Arg Ser Ala Thr
 65 70 75 80
 Phe Ser Gly Gln Ala Ala Leu Val Thr Val His Glu Ala Trp Asn Ala
 95
 30 Ala Arg Leu Gln Ala Val Pro Gly His Arg Ile Gly Leu Val Val Gly
 100 105 110
 Gly Thr Asn Val Gln Gln Arg Asp Leu Val Leu Met Gln Asp Ala Tyr
 115 120 125
 35 Arg Glu Arg Val Pro Phe Leu Arg Ala Ala Tyr Gly Ser Thr Phe Met
 130 135 140
 40 Asp Thr Asp Leu Val Gly Leu Cys Thr Gln Gln Phe Ala Ile His Gly
 145 150 155 160
 Met Ser Phe Thr Val Gly Gly Ala Ser Ala Ser Gly Leu Leu Ala Val
 165 170 175
 45 Ile Gln Ala Ala Glu Ala Val Leu Ser Arg Lys Val Asp Val Cys Ile
 180 185 190
 50 Ala Val Gly Ala Leu Met Asp Val Ser Tyr Trp Glu Cys Gln Gly Leu
 195 200 205
 Arg Ala Met Gly Ala Met Gly Thr Asp Arg Phe Ala Arg Glu Pro Glu
 210 215 220
 55 Arg Ala Cys Arg Pro Phe Asp Arg Glu Ser Asp Gly Phe Ile Phe Gly
 225 230 235 240
 Glu Ala Cys Gly Ala Val Val Val Glu Ser Ala Glu His Ala Arg Arg
 245 250 255
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Arg Gly Val Thr Pro Arg Gly Ile Leu Ser Gly Trp Ala Met Gln Leu
 260 265 270

5 Asp Ala Ser Arg Gly Pro Leu Ser Ser Ile Glu Arg Glu Ser Gln Val
 275 280 285

Ile Gly Ala Ala Leu Arg His Ala Asp Leu Ala Pro Glu Arg Val Asp
 290 295 300

10 Tyr Val Asn Pro His Gly Ser Gly Ser Arg Gln Gly Asp Ala Ile Glu
 305 310 315 320

Leu Gly Ala Leu Lys Ala Cys Gly Leu Thr His Ala Arg Val Asn Thr
 325 330 335

15 Thr Lys Ser Ile Thr Gly His Gly Leu Ser Ser Ala Gly Ala Val Gly
 340 345 350

20 Leu Ile Ala Thr Leu Val Gln Leu Glu Gln Gly Arg Leu His Pro Ser
 355 360 365

Leu Asn Leu Val Asp Pro Ile Asp Ser Ser Phe Arg Trp Val Gly Ala
 370 375 380

25 Thr Ala Glu Ala Gln Ser Leu Gln Asn Ala Leu Val Leu Ala Tyr Gly
 385 390 395 400

Phe Gly Gly Ile Asn Thr Ala Val Ala Val Arg Arg Ser Ala Thr Glu
 405 410 415

30 Ser

35 <210> 17
 <211> 262
 <212> Amino acid
 <213> Myxococcus xanthus

40 <400> 17
 Met Gln Ala Ala Ser Pro Pro His Arg Asp Tyr Gln Thr Leu Arg Val
 1 5 10 15

45 Arg Phe Glu Ala Gln Thr Cys Phe Leu Gln Leu His Arg Pro Asp Ala
 20 25 30

Asp Asn Thr Ile Ser Arg Thr Leu Ile Asp Glu Cys Gln Gln Val Leu
 35 40 45

50 Thr Leu Cys Glu Glu His Ala Thr Thr Val Val Leu Glu Gly Leu Pro
 50 55 60

His Val Phe Cys Met Gly Ala Asp Phe Arg Ala Ile His Asp Arg Val
 65 70 75 80

55 Asp Asp Gly Arg Arg Glu Gln Gly Asn Ala Glu Gln Leu Tyr Arg Leu
 85 90 95

60 Trp Leu Gln Leu Ala Thr Gly Pro Tyr Val Thr Val Ala His Val Gln
 100 105 110

Gly Lys Ala Asn Ala Gly Gly Leu Gly Phe Val Ser Ala Cys Asp Ile
 115 120 125
 5 Val Leu Ala Lys Ala Glu Val Gln Phe Ser Leu Ser Glu Leu Leu Phe
 130 135 140
 Gly Leu Phe Pro Ala Cys Val Met Pro Phe Leu Ala Arg Arg Ile Gly
 145 150 155 160
 10 Ile Gln Arg Ala His Tyr Leu Thr Leu Met Thr Arg Pro Ile Asp Ala
 165 170 175
 Ala Gln Ala Leu Ser Trp Gly Leu Ala Asp Ala Val Asp Ala Asp Ser
 180 185 190
 15 Glu Lys Leu Leu Arg Leu His Leu Arg Arg Leu Arg Cys Leu Ser Lys
 195 200 205
 20 Pro Ala Val Thr Gln Tyr Lys Lys Tyr Ala Ser Glu Leu Gly Gly Gln
 210 215 220
 Leu Leu Ala Ala Met Pro Arg Ala Ile Ser Ala Asn Glu Ala Met Phe
 225 230 235 240
 25 Ser Asp Arg Ala Thr Leu Glu Ala Ile His Arg Tyr Val Glu Thr Gly
 245 250 255
 Arg Leu Pro Trp Glu Ser
 260
 30
 <210> 18
 <211> 256
 <212> Amino acid
 35 <213> Myxococcus xanthus
 <400> 18
 Met Gly Ile Met Thr Glu Gly Thr Pro Met Ala Pro Val Val Thr Leu
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 40 His Glu Val Glu Glu Gly Val Ala Gln Ile Thr Leu Val Asp Arg Glu
 20 25 30
 Asn Lys Asn Met Phe Ser Glu Gln Leu Val Arg Glu Leu Ile Thr Val
 35 40 45
 Phe Gly Lys Val Asn Gly Asn Glu Arg Tyr Arg Ala Val Val Leu Thr
 50 55 60
 50 Gly Tyr Asp Thr Tyr Phe Ala Leu Gly Gly Thr Lys Ala Gly Leu Leu
 65 70 75 80
 Ser Ile Cys Asp Gly Ile Gly Ser Phe Asn Val Thr Asn Phe Tyr Ser
 85 90 95
 55 Leu Ala Leu Glu Cys Asp Ile Pro Val Ile Ser Ala Met Gln Gly His
 100 105 110
 60 Gly Val Gly Gly Gly Phe Ala Met Gly Leu Phe Ala Asp Phe Val Val
 115 120 125

Leu Ser Arg Glu Ser Val Tyr Thr Thr Asn Phe Met Arg Tyr Gly Phe
 130 135 140

5 Thr Pro Gly Met Gly Ala Thr Tyr Ile Val Pro Lys Arg Leu Gly Tyr
 145 150 155 160

Ser Leu Gly His Glu Leu Leu Leu Asn Ala Arg Asn Tyr Arg Gly Ala
 165 170 175

10 Asp Leu Glu Lys Arg Gly Val Pro Phe Pro Val Leu Pro Arg Lys Glu
 180 185 190

Val Leu Pro His Ala Tyr Glu Ile Ala Arg Asp Leu Ala Ala Lys Pro
 195 200 205

15 Arg Leu Ser Leu Val Thr Leu Lys Arg His Leu Val Arg Asp Ile Arg
 210 215 220

20 Arg Glu Leu Pro Asp Val Ile Glu Arg Glu Leu Glu Met His Gly Ile
 225 230 235 240

Thr Phe His His Asp Asp Val Arg Arg Arg Ile Glu Gln Leu Phe Leu
 245 250 255

25

30 <210> 19
 <211> 424
 <212> Amino acid
 <213> Myxococcus xanthus

<400> 19

35 Met Leu Asn Leu Ile Asn Asn His Ala His Gly Tyr Val Val Thr Pro
 1 5 10 15

Val Val Leu Ala Cys Asn Asp Ala Gly Leu Phe Glu Leu Leu Arg Gln
 20 25 30

40 Gly Pro Lys Asp Phe Asp Arg Leu Ala Glu Ala Leu Arg Ala Asn Arg
 35 40 45

45 Gly His Leu Arg Val Ala Met Arg Met Phe Glu Ser Leu Gly Trp Val
 50 55 60

Arg Arg Asp Ala Asp Asp Val Tyr Ala Val Thr Ala Ala Ala Ala Ala
 65 70 75 80

50 His Arg Ser Phe Pro Arg Glu Ala Gln Ser Leu Phe Ala Leu Pro Met
 85 90 95

Asp Arg Tyr Leu Arg Gly Glu Asp Gly Leu Ser Leu Ala Pro Trp Phe
 100 105 110

55 Glu Arg Ser Arg Ala Ser Trp Asp Thr Asp Asp Thr Leu Val Arg Glu
 115 120 125

60 Leu Leu Asp Gly Ala Ile Ile Thr Pro Leu Met Leu Ala Leu Glu Gln
 130 135 140

Arg Gly Gly Leu Lys Glu Ala Arg Arg Leu Ser Asp Leu Trp Ser Gly
 145 150 155 160
 5 Gly Asp Gly Arg Asp Thr Cys Val Pro Glu Ala Val Gln His Glu Leu
 165 170 175
 Ala Gly Phe Phe Ser Ala Gln Lys Trp Thr Arg Glu Asp Ala Val Asp
 180 185 190
 10 Ala Glu Leu Thr Pro Lys Gly Ala Phe Ile Phe Glu Arg Ala Leu Leu
 195 200 205
 Phe Ala Ile Val Gly Ser Tyr Arg Pro Met Leu Ala Ser Met Pro Gln
 210 215 220
 15 Leu Leu Phe Gly Asp Cys Asp Gln Val Phe Gly Arg Asp Glu Ala Gly
 225 230 235 240
 20 His Glu Leu His Leu Asp Arg Thr Leu Asn Val Ile Gly Ser Gly His
 245 250 255
 Gln His Arg Lys Tyr Phe Ala Glu Leu Glu Lys Leu Ile Ile Thr Val
 260 265 270
 25 Phe Asp Ala Glu Asn Leu Ser Ala Gln Pro Arg Tyr Ile Ala Asp Met
 275 280 285
 Gly Cys Gly Asp Gly Thr Leu Leu Lys Arg Val Tyr Glu Thr Val Leu
 290 295 300
 30 Arg His Thr Arg Arg Gly Arg Ala Leu Asp Arg Phe Pro Leu Thr Leu
 305 310 315 320
 35 Ile Ala Ala Asp Phe Asn Glu Lys Ala Leu Glu Ala Ala Gly Arg Thr
 325 330 335
 Leu Ala Gly Leu Glu His Val Ala Leu Arg Ala Asp Val Ala Arg Pro
 340 345 350
 40 Asp Arg Leu Ile Glu Asp Leu Arg Ala Arg Gly Leu Ala Glu Pro Glu
 355 360 365
 Asn Thr Leu His Ile Arg Ser Phe Leu Asp His Asp Arg Pro Tyr Gln
 370 375 380
 45 Pro Pro Ala Asp Arg Ala Gly Leu His Ala Arg Ile Pro Phe Asp Ser
 385 390 395 400
 50 Val Phe Val Gly Lys Ala Gly Gln Glu Val Val Pro Ala Glu Val Phe
 405 410 415
 His Ser Leu Val Glu His Leu Glu
 420
 55 <210> 20
 <211> 19053
 <212> DNA
 <213> Myxococcus xanthus
 60 <400> 20

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| | gtcgacgttg | acgtcgcccc | gtggcggtgcc | gtgtgtcttc | ttcgacgcgg | aggtgcgcca | 60 |
| | ggtggcgggc | gacggccggc | gcgggcccgt | ggtgtcgcgt | gagcgcgcg | atgcgcccgt | 120 |
| | actggcgctg | cgtggccagc | gcctccatgc | ttcggtgtcc | ttttcgcccc | cgctcgctgat | 180 |
| 5 | ggctccggtg | gaggtgcgcc | ggtgcaaggc | cctgccaggc | acggtgcccc | cgctcctggta | 240 |
| | tcagacggcg | cacccggagg | ccctgtctcg | ggagcgcggtg | ggcgcggtgg | gcgaatcctg | 300 |
| | cctcgtggtg | ggtgaactcc | ggagggggccc | tgtcgagggc | agctacgccc | tggtcggtcg | 360 |
| | ggagggcgcc | cccgcgatgt | tgggtgctggg | accccaggct | ccggccacct | gtgggacgct | 420 |
| | ggcgcgccgg | gcctggcgcc | acttcgcggc | ggccgggggtg | ctgtccatgg | ccgcggccgt | 480 |
| 10 | cgctcctgtca | ggggcgctgt | gagacgcgcg | gcggggggccg | taccgcccgcg | ccagaaacgt | 540 |
| | gatgcgccgc | caggcctcgc | ggtccgggca | ctgacgcccc | ggccgctcgg | gactcgctca | 600 |
| | ggcggtctccg | gtgcttcgcg | cggtggagaa | cacgagctgt | tcctcgctgt | ccgccacccg | 660 |
| | cacggtgagg | gtccgcctcca | cgccggcgag | gccagcgggc | gtggactgcg | ccaggtccga | 720 |
| | gagcagggag | cccgcagcgc | gcaggtggaa | gccggtgggtc | cacatgccct | ccagctcgcc | 780 |
| 15 | gaacacggtg | cgcagctcgt | ccggggccctt | gcgttcgtcg | atggcgcggc | gcaggcgcac | 840 |
| | catgccgctc | acgaagtccc | tgcaccgcct | gagcggtgtg | gggttcttgg | agatgacctc | 900 |
| | cgcgaaagctg | aagtgcgcgc | cacccggggcg | ccactcgctt | tcgatgagct | gcaggtccct | 960 |
| | gccaaggtcg | cgcaccgtgg | ggtcccttctg | gaagtaccac | ttggcgatct | gcgcggcgcg | 1020 |
| | gctgggtgac | aagtcattca | gcatgaggct | gccttgctcc | tgcacctcgc | ggaggtaggc | 1080 |
| 20 | ctcccagatg | ggggcgtaga | ccgcgcgcgcg | gaactcggcg | gaggcgcggg | gaagctgctc | 1140 |
| | gctccagggc | agcgcgcggg | ccaggggcgcg | tgagaagcgg | gacagctcga | gcgtctggat | 1200 |
| | gcggggcacc | agggcgcgga | acgagtcctc | cgccatcttc | agctcgagcc | gcgtttcgat | 1260 |
| | gggggtgcttg | cccatgtcct | cctgcctggt | gctgatgacg | gtggcccgct | ccttcgcgtc | 1320 |
| | cagcacgccc | cagacgacgg | cgctcatccac | cgcctgctgc | aggtccttgc | gcgacagctt | 1380 |
| 25 | cttctgcccgt | ccccacagca | tcaggtgcag | gccgtagccg | aagtcggagg | ccacgggggt | 1440 |
| | gggagagaag | cgcgtcatgt | ccgccttcag | gtccaccacc | caactggccgc | gggtgcccag | 1500 |
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| | ctcctgcgtc | accaggact | gcttgctgac | gttcttcgccc | ttgagcagct | cgaacgagcc | 1620 |
| | cagccccagt | gagaagccga | tggcctgctg | gcgcgtgagc | gtggtggcgt | gcaggtagtt | 1680 |
| 30 | gcgcagctcg | aactcgctct | gctggggcggg | gaggctcttc | atccacttca | gcagctccac | 1740 |
| | cagggttgccc | ttgagcaggg | actcgtggaa | gcgcctcgcg | gtgacgtcct | ccacgacgac | 1800 |
| | ctccagcagc | gtggaggtct | ccgacaggcg | caggtattcg | tactcgaagc | cctcgggcgac | 1860 |
| | ctgcgtgccc | acggcgcttct | ccagcgactc | tgcgacgcgg | gccttgaagt | cgggcccaggc | 1920 |
| | ctgcggaagg | ttggccgggt | ccgcaagctg | cgggtcgatg | ccaaggcgct | ccagcaccag | 1980 |
| 35 | gcccagcacc | ttcttctgat | tgtcgctcag | cttcgccttg | ctggccttgt | ccaccaggcc | 2040 |
| | gtccatgatt | tccaccgcgg | tgggtgccctt | cttgacgagg | tcgcgaagga | cgggccccag | 2100 |
| | cagcgcttcc | agcaactggc | ccagttgggg | cttcaccgtc | gccgggtcca | gcagctccac | 2160 |
| | ggtgatgccc | aggccggcg | agagcgccctg | ctcatgggac | ttcaccttgc | gcacggcgac | 2220 |
| | ctggatgcgg | ccggcacggg | gacggggagaa | gctgagctgg | tagtcgtcgg | tgagggacac | 2280 |
| 40 | ccggggcgac | aggcccgcct | tggcgctggg | cttcaacgcg | agcagctcgt | tgcgcgcgag | 2340 |
| | gaagcccagg | cggttgaggt | tgggtggggaa | gatgtccgccc | cagttgagct | ccagccgtgt | 2400 |
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| | gatggacgct | tcgccggtgg | cttcgaagga | gagggtgaag | ccgtgcatgg | cgagcttggg | 2820 |
| 40 | cggaaggatt | ttctcttccg | tgaaggtccc | ctgggcccagc | ggcaccttga | tgtcctgggtc | 2880 |
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